Appendix 1

All animals

Forty-six mice (25±2 g, n=46) were numbered from 1 to 46 and a random number generation method was used to select 6 mice from the numbered list as the sham surgery group, while the remaining 40 were assigned to the surgery group.

Survival of mice

Among the 40 mice that underwent coronary artery ligation surgery, one died during the operation due to ventricular fibrillation. The remaining 39 mice were randomly assigned to the MI, MI + Saline, and MI + Hydrogels groups, with 13, 14, and 12 mice in each group, respectively. One mouse in the MI group died within 1 week after surgery, and 38 mice survived for 28 days with a survival rate of 95%. The sham surgery group had no deaths and a 100% survival rate.

mRNA sequencing

Three mice from each of the MI + Saline and MI + Hydrogels groups were randomly selected for mRNA sequencing.

Echocardiography

6, 12, 11, and 9 mice were left in the Sham, MI, MI + Saline, and MI + Hydrogels groups, respectively, for echocardiography.

RNA extraction, histological analysis and fluorescence immunohistochemistry assay

Four mice from each group were selected for RNA extraction, while the remaining mice were used for tissue sectioning and immunofluorescent staining. Due to the insufficient number of mice in the sham surgery group, we added 5 mice that received the same treatment as the sham surgery group for experimental analysis.

Randomisation

We utilized a pseudorandom number generator in R language to randomly assign 38 surviving mice to MI, MI + Saline, and MI + Hydrogels groups.

Firstly, we numbered the mice from 1 to 38 and randomly shuffled the numbers using the sample function. Then, we allocated the mice to three groups and employed a random number generation method to perform the grouping. Specifically, we utilized a loop to randomly shuffle the mouse numbers in each iteration and calculated the number of mice in each group. If the difference in the number of mice between any two groups did not exceed 1, we returned the grouping result.

Blinding

For each animal, three different investigators were involved as follows: a first investigator performed the relevant experiments according to random groups. This investigator was the only person aware of the treatment group allocation. A second investigator was responsible for the anaesthetic procedure. A third investigator (also unaware of treatment) assessed postoperative myocardial infarction in each group of mice.

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